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DSSD CENSUS 2000 PROCEDURES AND OPERATIONS MEMORANDUM SERIES B-17*

MEMORANDUM FOR Howard Hogan
Chief, Decennial Statistical Studies Division

From: Donna Kostanich *DK*
Assistant Division Chief, Sampling and Estimation
Decennial Statistical Studies Division

Prepared by: Richard A. Griffin *R.A.G.*
Chief, Estimation Staff

Subject: Census 2000 - Missing Housing Unit Status and Population Data

The attached document was prepared, per your request, to assist the Executive Steering Committee on A.C.E. Policy in assessing the data with and without statistical correction.

This report focuses on missing data in the 2000 Census. Imputation for missing data is necessary even if we were not doing an A.C.E. The analysis is limited to situations where the status of the housing can not be determined or for occupied housing units the number of persons residing there is unknown or all the persons are missing. This memorandum is included in the B memorandum series because the quality of the Census should be a consideration in the decision on releasing statistically corrected data.

Census 2000: Missing Housing Unit Status and Population Data

Richard A. Griffin
U.S. Census Bureau

Table of Contents

Executive Summary	1
What is the overall level of missing housing unit status?	1
How does imputed housing unit status compare to that of classified records?	1
What level of population was imputed?	1
What additional level of substitution was needed?	2
How does this compare with the level of missing data in the 1990 Census?	2
Introduction	3
Results	3
How Much Imputation of Housing Unit Status?	3
How Much Imputation of Population?	4
How Much Population Substitution?	5
References	5
Appendices	
Appendix 1. Methodology for Imputation of Housing Unit Status and Population Count	6
Appendix 2. Methodology for Population Substitution	8

Tables

Table 1: Percent Distribution of Preliminary Housing Unit Records	9
Table 2: Distributions of Classified and Imputed Housing Unit Records	10
Table 3: Distribution of Occupied Housing Units	11
Table 4: Distribution of Population in Housing Units	12
Table 5: Population per Housing Unit	13
Table 6: Completeness of Data for Persons in Households - 1990 Census vs. 2000 Census ...	14

Census 2000: Missing Housing Unit Status and Population Data

prepared by Richard A. Griffin

Executive Summary

We assessed the level of missing data in Census 2000. This report is limited to missing housing status, missing population count and missing persons in housing units. Group quarters and persons residing in group quarters are excluded from this analysis. The preliminary Hundred Percent Census Unedited File (HCUF) was used to assign missing housing unit status and missing population count. The final Census Hundred Percent Edited File (HCEF) includes the results of assigning missing persons in housing units. These files differ in that the preliminary HCUF includes records flagged as duplicates as well as nonexistent housing units. Missing data from the HCEF are compared to data from the 1990 Census.

What is the overall level of missing housing unit status?

Of all the housing unit records on the preliminary HCUF, 0.4 percent were missing a status of occupied, vacant or nonexistent (delete). For States this percent ranged from 0.2 percent to 1.1 percent.

How does imputed housing unit status compare to the distribution of classified records?

The imputation procedure created proportionately fewer occupied housings units and proportionately more vacant and delete housing units. Across the U.S., 87.3 percent of classified units on the preliminary HCUF were occupied and 56.2 percent of the unclassified units were imputed as occupied. This was due to the fact that donor pools were restricted when possible to housing units that were subjected to field follow-up activities. In addition units nearby unclassified units tend to be disproportionately unoccupied.

What level of population was imputed?

Of all the person records on the preliminary HCUF **AFTER** imputation only 0.4 percent were imputed. These persons were imputed either for unclassified housing units or for known occupied housing units with missing population count. For states this ranged from 0.2 percent to 1.1 percent.

Of all the persons on the final HCEF about 0.4 percent also had their population count imputed. The state percentages from the HCEF are nearly identical to those from the preliminary HCUF.

What additional level of substitution was needed?

About 0.8 percent additional persons were imputed via substitution for census response records that consisted of only an occupied status and a population count. This brings the total percent of substituted persons in the 2000 Census to almost 1.3 percent.

How does this compare to the level of missing data in the 1990 Census?

In the 1990 Census only about 0.02 percent had their population count imputed and the percent of substituted persons was only about 0.7 percent.

Introduction

Following data collection activities, an inventory of census housing units is established. Information about the housing unit may be missing. During the “Unclassified” process, missing data is imputed (filled in) for:

- Unclassified units - Units with undetermined status of occupied, vacant, or nonexistent.
- Missing household population - Units determined to be occupied, but the number of persons living there is not known.

This imputation process uses a nearest- neighbor hot deck to fill in missing housing unit status and missing population count. The process is implemented on the preliminary Hundred percent Census Unedited File (HCUF) which includes the potential duplicates as well as nonexistent housing unit records.

A subsequent Census process, substitution, fills in the missing persons for unclassified housing units imputed occupied as well as the known occupied housing units with missing household population that was imputed. Substitution is also necessary for occupied housing units with a known population if all the person data is missing. The substitution edit replicates the person records from nearby fully enumerated households of the same size in their entirety. Neither substitution nor this imputation procedure is applied to the group quarters population.

More details on the methodology are given in the appendices.

The purpose of this report is to get an indication of the level of missing data in Census 2000. While missing data is a potential source of error in the Census, it can also introduce additional variability into the Dual System Estimates from the Accuracy and Coverage Evaluation Survey.

This report excludes analysis of missing characteristics, such as age, sex and race.

Results

How Much Imputation of Housing Unit Status?

Table 1 provides a percentage distribution of housing units on the Preliminary HCUF. Classified records on the Preliminary HCUF are classified as either occupied, vacant, or delete. Some of the units classified occupied have an unknown population count which must be imputed. For the U.S., 99.6 percent of over 122 million housing units on the Preliminary HCUF were classified occupied, vacant, or delete. Almost 0.4 percent of the housing units were unclassified and were

imputed as either occupied, vacant, or delete. Of all the records on the preliminary HCUF, 0.2 percent were imputed as occupied, 0.1 percent were imputed as vacant and only 0.04 percent were imputed as delete or nonexistent. The percent of imputed records on this file varies some by state. Vermont needed about 1.1 percent of its records imputed whereas Iowa needed only 0.2 percent of its records imputed.

Table 2 provides percentage distributions separately for classified and unclassified units or those units requiring imputation. For the U.S. 87.3 percent of the classified units were occupied, 8.4 percent were vacant, and 4.3 percent were delete. For the imputed units this distribution is different: 56.2 percent were imputed as occupied, 34.2 percent were imputed as vacant, and 9.6 percent were imputed as delete. There are higher percentages of unclassified units imputed vacant and delete than the percentages of classified units that are vacant or delete. This is due to the fact that donor pools were restricted, when possible, to housing units that were subjected to field follow-up activities. In addition units nearby unclassified units tend to be disproportionately unoccupied.

Table 3 shows the percentage distribution of occupied housing units **AFTER** imputation into three categories. For the U.S., after the imputation process, 99.6 percent of the nearly 107 million occupied units were initially occupied with a population count and thus required no imputation. About 0.2 percent were known to be occupied but had a unknown population count which was imputed. Another 0.3 percent were unclassified and a classification of occupied along with a population count was imputed using the nearest neighbor hot deck.

How Much Imputation of Population?

Table 4 shows the population in housing units **AFTER** imputation and the percentage of these persons who were imputed and not imputed. The imputed persons could be in either (1) housing units known to be occupied with an unknown population count that was imputed or (2) unclassified units that were imputed via a nearest neighbor hot deck occupied donor. For the U.S., 0.4 percent of the population in housing units were imputed and 99.6 percent were not imputed. For states the percent imputed population could be as high as 1.1 percent or as low as 0.2 percent.

Table 5 shows the persons per occupied housing unit. For each row, the first column is the total persons per occupied housing unit **AFTER** imputation. The second column is the persons per occupied housing unit for units that did not require an imputed population count. This is always almost exactly the same as the Total column because only a small percentage of occupied units require imputation of the population count. The third column is the persons per occupied housing unit for final occupied housing units that required an imputed population count. For the U.S. the total persons per occupied housing unit is 2.60 while there were 2.56 persons per occupied

housing unit for imputed occupied units. Over the entire U.S. occupied nearest neighbor donors had slightly fewer persons on average than all initially occupied units.

How Much Population Substitution?

Table 6 shows the percentage of the population in substituted households and the percentage of the population imputed due to the “unclassified” process for the 1990 Census and the 2000 Census. This data was obtained from the final Hundred percent Census Edited File (HCEF). This file has fewer persons than the preliminary HCUF since the duplicates have been removed. The data for all persons imputed due to the “unclassified” process is obtained via substitution. Thus, any person imputed due to the “unclassified” process is also in a substituted household. The population for occupied housing units with a known population with all the person data missing can be obtained by subtraction. For the U.S. for Census 2000, 0.43 percent of persons on the HCEF were imputed due to the “unclassified” process. A total of 1.26 percent of persons were in substituted households. Thus, 0.83 percent of persons were substituted for occupied housing units with a known population count with all person data missing.

In the 1990 Census about 0.02 percent of persons were in either unclassified units imputed as occupied or known occupied units with an imputed population count. In 1990 a total of only 0.66 percent of persons were in substituted households. Thus, nearly all of the missing persons were due to substituted persons in occupied housing units with a known population count.

For Census 2000 the relative level of population count imputation and substitution has increased since the 1990 Census. The processing procedures were different in 1990 than 2000 and these are currently under investigation.

References

Durant, C. and Kilmer, A.(2000), DSSD Census 2000 Procedures and Operations Memorandum Series Q-34, Census 2000 Specifications for Imputing Housing Unit Status and Population Count

Methodology for Imputation of Housing Unit Status and Population Count

In general, the nearest-neighbor hot deck method is used for filling in housing unit status and missing population count. Although group quarters are not utilized as a source for filling in missing data, they are included in order to determine the nearest-housing unit neighbor.

The hot decking is done separately for each Local Census Office (LCO). A preliminary Hundred Percent Census Unedited File (HCUF) is used to determine the records requiring imputation and to identify donor records. This file includes two types of housing unit records:

1. All housing unit records with classified status as occupied, vacant, or nonexistent (delete). The nonexistent housing unit records include double deletes (kills) based on field activities. Some of the occupied classified units have a missing household population.
2. All housing unit records without status assigned. Some of these are known to exist but it is not known if they are occupied or vacant. For the remainder it is not known if they are occupied, vacant, or nonexistent.

In general, there was conflicting information about the double delete records. These were determined as nonexistent through at least two census operations. For the final HCUF, all records identified or imputed as delete are removed. Note also that the preliminary HCUF included housing unit records that were later determined to be duplicate records. These were not identified as such on the preliminary HCUF.

Three types of units require imputation:

- Units classified as occupied but with no population count.
- Unclassified units that we know exist. These are either occupied or vacant.
- Unclassified units for which we know nothing. These are either occupied, vacant, or delete.

For estimation purposes, six categories are defined. Each of the three types of units above are divided into two groups: single unit addresses and multi-unit addresses. Table A defines each estimation category by the type of donee record and the associated donor pool.

Table A. Estimation Categories and Donor Pools for each LCO

Estimation Category	Donees	Donor Pool
1. Single units 2. Multi-units	Occupied units with no household population.	Occupied units with a population count from an enumerator completed form. For mailback areas, restricted to completed forms that were subjected to field follow up activities.
3. Single units 4. Multi-units	Unclassified units which exist, but do not know whether occupied or vacant.	Occupied or vacant units from an enumerator completed form. For mailback areas, restricted to completed forms that were subjected to field follow up activities.
5. Single units 6. Multi-units	Unclassified units for which we know nothing.	Occupied, vacant, or delete units from an enumerator completed form. For mailback areas, restricted to completed forms that were subjected to field follow up activities.

Each potential donor record can be used as a donor only once. In general, the nearest donor record selected is from the same tract as the donee. For multi-unit structure records, the same multi-unit is used as donors for multi-unit structure donees. If there are more donees than donors in a multi-unit structure, the nearest multi-unit structure in the same tract is used for donors.

Methodology for Population Substitution

Substitution is the assignment of a full set of characteristics for all persons in housing units for which no population data appear on the file for anyone in the household. This occurs under the following situations:

- when the status of a housing unit was unknown and was imputed as occupied, its population count was also imputed and consequently no person data was available.
- when a housing unit was known to be occupied but no population count was available and again no person data was available.
- when a census response included the population count for the housing unit but no person data was provided.

For these situations the substitution process replicates person records for these households of the same size in their entirety from a fully enumerated nearby household. The assignment of the full set of housing characteristics occurs when there is no housing information available. If the housing unit is determined to be occupied, the housing characteristics are assigned from a previously processed occupied unit. If the housing unit is vacant, the housing characteristics are assigned from a previously processed vacant unit.

Table 1. Percent Distribution of Preliminary Housing Unit Records

Source: Preliminary HCUF

	Preliminary Records	Classified Records				Imputed Records			
		Total	Occupied	Vacant	Delete	Total	Occupied	Vacant	Delete
United States	122,534,761	99.61	86.95	8.41	4.25	0.39	0.22	0.13	0.04
Alabama	2,121,119	99.64	83.47	10.61	5.57	0.36	0.20	0.12	0.03
Alaska	280,243	99.27	79.79	13.80	5.67	0.73	0.38	0.27	0.09
Arizona	2,324,238	98.92	82.49	11.99	4.44	1.08	0.43	0.54	0.11
Arkansas	1,254,433	99.67	84.49	10.31	4.87	0.33	0.19	0.12	0.03
California	12,782,697	99.63	90.45	5.48	3.71	0.37	0.22	0.10	0.04
Colorado	1,913,012	99.67	87.38	7.74	4.56	0.33	0.18	0.12	0.03
Connecticut	1,454,964	99.71	90.23	5.74	3.73	0.29	0.19	0.08	0.02
Delaware	362,897	99.58	83.10	12.14	4.34	0.42	0.24	0.16	0.03
D.C.	288,644	99.65	85.94	9.10	4.61	0.35	0.22	0.11	0.02
Florida	7,694,983	99.37	82.90	12.34	4.13	0.63	0.30	0.28	0.05
Georgia	3,567,192	99.67	85.59	7.66	6.41	0.33	0.20	0.09	0.03
Hawaii	497,962	99.59	82.43	11.46	5.71	0.41	0.22	0.14	0.05
Idaho	564,579	99.41	84.10	10.15	5.17	0.59	0.32	0.18	0.08
Illinois	5,182,050	99.59	89.37	5.59	4.63	0.41	0.25	0.09	0.06
Indiana	2,684,279	99.53	87.90	7.21	4.42	0.47	0.28	0.13	0.06
Iowa	1,284,264	99.80	90.31	6.43	3.06	0.20	0.12	0.06	0.01
Kansas	1,181,388	99.77	88.64	7.84	3.28	0.23	0.14	0.08	0.02
Kentucky	1,860,882	99.61	86.79	8.54	4.28	0.39	0.23	0.10	0.05
Louisiana	2,004,110	99.76	84.09	9.50	6.17	0.24	0.15	0.07	0.02
Maine	682,186	99.24	76.75	19.22	3.28	0.76	0.34	0.40	0.02
Maryland	2,235,521	99.71	89.36	7.29	3.06	0.29	0.18	0.09	0.02
Massachusetts	2,746,158	99.69	89.80	6.42	3.47	0.31	0.19	0.10	0.03
Michigan	4,430,001	99.70	86.14	10.03	3.53	0.30	0.15	0.12	0.03
Minnesota	2,151,389	99.76	88.81	7.83	3.12	0.24	0.11	0.12	0.01
Mississippi	1,250,363	99.54	85.47	9.19	4.87	0.46	0.29	0.12	0.05
Missouri	2,567,782	99.75	86.36	9.55	3.84	0.25	0.13	0.10	0.02
Montana	436,287	99.46	82.75	12.19	4.53	0.54	0.30	0.19	0.04
Nebraska	747,189	99.77	89.63	7.49	2.66	0.23	0.13	0.08	0.01
Nevada	861,325	98.96	87.17	8.59	3.20	1.04	0.65	0.30	0.10
New Hampshire	573,597	99.32	83.67	12.36	3.30	0.68	0.35	0.30	0.03
New Jersey	3,473,550	99.76	89.20	7.03	3.54	0.24	0.14	0.08	0.02
New Mexico	837,405	99.17	81.92	12.03	5.22	0.83	0.47	0.28	0.08
New York	8,257,545	99.67	86.49	7.46	5.72	0.33	0.20	0.10	0.03
North Carolina	3,757,623	99.58	84.72	10.33	4.53	0.42	0.23	0.13	0.05
North Dakota	305,645	99.70	84.90	10.54	4.26	0.30	0.16	0.12	0.02
Ohio	4,999,567	99.77	89.60	6.70	3.47	0.23	0.15	0.06	0.02
Oklahoma	1,591,607	99.69	85.20	10.72	3.77	0.31	0.17	0.12	0.02
Oregon	1,544,180	99.43	87.02	7.62	4.79	0.57	0.35	0.14	0.08
Pennsylvania	5,541,364	99.67	87.20	8.44	4.03	0.33	0.19	0.11	0.03
Rhode Island	461,850	99.71	89.31	6.76	3.65	0.29	0.18	0.08	0.03
South Carolina	1,929,859	99.48	81.23	11.28	6.98	0.52	0.27	0.19	0.05
South Dakota	338,255	99.54	86.34	9.60	3.60	0.46	0.27	0.15	0.03
Tennessee	2,619,407	99.67	86.57	7.85	5.26	0.33	0.20	0.08	0.04
Texas	8,568,761	99.61	87.11	8.83	3.67	0.39	0.24	0.12	0.03
Utah	817,820	99.71	86.66	8.15	4.90	0.29	0.16	0.10	0.03
Vermont	314,498	98.90	77.51	16.63	4.77	1.10	0.61	0.47	0.02
Virginia	3,021,828	99.79	90.12	6.73	2.94	0.21	0.12	0.07	0.02
Washington	2,601,491	99.57	88.11	6.83	4.62	0.43	0.27	0.11	0.06
West Virginia	893,162	99.68	83.62	12.01	4.05	0.32	0.17	0.11	0.04
Wisconsin	2,435,916	99.48	86.32	9.52	3.65	0.52	0.23	0.23	0.05
Wyoming	237,694	99.07	81.71	12.42	4.93	0.93	0.58	0.32	0.03
Puerto Rico	1,505,654	99.33	84.74	10.28	4.31	0.67	0.45	0.16	0.06

Table 2. Distributions of Classified and Imputed Housing Unit Records

Source: Preliminary HCUF

	Preliminary Records	Distribution of Classifieds				Distribution of Imputes			
		Total	Occupied	Vacant	Delete	Total	Occupied	Vacant	Delete
United States	122,534,761	100.0	87.3	8.4	4.3	100.0	56.2	34.2	9.6
Alabama	2,121,119	100.0	83.8	10.6	5.6	100.0	56.0	34.5	9.6
Alaska	280,243	100.0	80.4	13.9	5.7	100.0	51.8	36.3	11.9
Arizona	2,324,238	100.0	83.4	12.1	4.5	100.0	39.5	50.0	10.5
Arkansas	1,254,433	100.0	84.8	10.3	4.9	100.0	56.8	35.6	7.6
California	12,782,697	100.0	90.8	5.5	3.7	100.0	60.8	28.5	10.6
Colorado	1,913,012	100.0	87.7	7.8	4.6	100.0	54.0	36.8	9.1
Connecticut	1,454,964	100.0	90.5	5.8	3.7	100.0	65.2	26.6	8.2
Delaware	362,897	100.0	83.5	12.2	4.4	100.0	55.9	37.8	6.3
D.C.	288,644	100.0	86.2	9.1	4.6	100.0	63.7	31.0	5.3
Florida	7,694,983	100.0	83.4	12.4	4.2	100.0	48.3	44.4	7.3
Georgia	3,567,192	100.0	85.9	7.7	6.4	100.0	61.7	28.5	9.8
Hawaii	497,962	100.0	82.8	11.5	5.7	100.0	53.8	33.3	12.9
Idaho	564,579	100.0	84.6	10.2	5.2	100.0	55.5	31.0	13.6
Illinois	5,182,050	100.0	89.7	5.6	4.6	100.0	62.4	23.0	14.5
Indiana	2,684,279	100.0	88.3	7.2	4.4	100.0	59.4	27.8	12.8
Iowa	1,284,264	100.0	90.5	6.4	3.1	100.0	60.1	32.8	7.1
Kansas	1,181,388	100.0	88.8	7.9	3.3	100.0	60.7	32.1	7.2
Kentucky	1,860,882	100.0	87.1	8.6	4.3	100.0	59.7	26.9	13.4
Louisiana	2,004,110	100.0	84.3	9.5	6.2	100.0	61.0	31.1	7.9
Maine	682,186	100.0	77.3	19.4	3.3	100.0	44.6	53.3	2.1
Maryland	2,235,521	100.0	89.6	7.3	3.1	100.0	59.9	32.1	8.0
Massachusetts	2,746,158	100.0	90.1	6.4	3.5	100.0	59.9	31.1	9.0
Michigan	4,430,001	100.0	86.4	10.1	3.5	100.0	49.3	42.0	8.7
Minnesota	2,151,389	100.0	89.0	7.8	3.1	100.0	45.0	49.6	5.4
Mississippi	1,250,363	100.0	85.9	9.2	4.9	100.0	63.2	25.4	11.4
Missouri	2,567,782	100.0	86.6	9.6	3.8	100.0	51.2	40.5	8.3
Montana	436,287	100.0	83.2	12.3	4.5	100.0	56.1	35.9	8.0
Nebraska	747,189	100.0	89.8	7.5	2.7	100.0	58.8	36.2	5.0
Nevada	861,325	100.0	88.1	8.7	3.2	100.0	62.1	28.3	9.6
New Hampshire	573,597	100.0	84.2	12.4	3.3	100.0	51.1	43.9	4.9
New Jersey	3,473,550	100.0	89.4	7.0	3.5	100.0	58.5	33.8	7.7
New Mexico	837,405	100.0	82.6	12.1	5.3	100.0	56.7	33.2	10.0
New York	8,257,545	100.0	86.8	7.5	5.7	100.0	60.0	31.4	8.6
North Carolina	3,757,623	100.0	85.1	10.4	4.6	100.0	55.8	31.9	12.3
North Dakota	305,645	100.0	85.2	10.6	4.3	100.0	53.9	40.6	5.5
Ohio	4,999,567	100.0	89.8	6.7	3.5	100.0	63.6	27.1	9.3
Oklahoma	1,591,607	100.0	85.5	10.8	3.8	100.0	54.7	38.0	7.3
Oregon	1,544,180	100.0	87.5	7.7	4.8	100.0	61.1	25.5	13.4
Pennsylvania	5,541,364	100.0	87.5	8.5	4.0	100.0	56.6	34.4	9.0
Rhode Island	461,850	100.0	89.6	6.8	3.7	100.0	62.0	27.2	10.8
South Carolina	1,929,859	100.0	81.7	11.3	7.0	100.0	52.8	36.7	10.5
South Dakota	338,255	100.0	86.7	9.6	3.6	100.0	60.3	33.7	6.0
Tennessee	2,619,407	100.0	86.9	7.9	5.3	100.0	61.8	24.8	13.4
Texas	8,568,761	100.0	87.4	8.9	3.7	100.0	61.7	30.6	7.8
Utah	817,820	100.0	86.9	8.2	4.9	100.0	53.7	34.5	11.8
Vermont	314,498	100.0	78.4	16.8	4.8	100.0	55.2	42.6	2.1
Virginia	3,021,828	100.0	90.3	6.7	2.9	100.0	57.8	32.7	9.4
Washington	2,601,491	100.0	88.5	6.9	4.6	100.0	61.4	25.6	13.0
West Virginia	893,162	100.0	83.9	12.0	4.1	100.0	53.6	34.5	12.0
Wisconsin	2,435,916	100.0	86.8	9.6	3.7	100.0	45.3	44.8	9.9
Wyoming	237,694	100.0	82.5	12.5	5.0	100.0	62.7	33.9	3.4
Puerto Rico	1,505,654	100.0	85.3	10.3	4.3	100.0	67.1	23.8	9.2

Table 3. Distributions of Occupied Housing Units

Source: Preliminary HCUF

	Occupied Housing Units	Percent of Occupied Housing Units		
		W/Pop	No Pop	Imputed
United States	106,810,995	99.56	0.19	0.25
Alabama	1,774,638	99.33	0.43	0.24
Alaska	224,680	99.43	0.09	0.47
Arizona	1,927,246	99.12	0.36	0.51
Arkansas	1,062,210	99.71	0.07	0.22
California	11,589,923	99.60	0.16	0.25
Colorado	1,674,879	99.63	0.17	0.20
Connecticut	1,315,635	99.68	0.11	0.21
Delaware	302,431	99.29	0.43	0.28
D.C.	248,701	99.06	0.68	0.26
Florida	6,402,468	99.46	0.18	0.37
Georgia	3,060,539	99.58	0.18	0.24
Hawaii	411,554	99.46	0.27	0.26
Idaho	476,620	99.47	0.14	0.38
Illinois	4,644,557	99.38	0.33	0.28
Indiana	2,366,985	99.57	0.12	0.31
Iowa	1,161,328	99.82	0.05	0.13
Kansas	1,048,870	99.75	0.09	0.16
Kentucky	1,619,379	99.67	0.06	0.27
Louisiana	1,688,110	99.67	0.16	0.17
Maine	525,860	99.51	0.06	0.44
Maryland	2,001,504	99.52	0.28	0.20
Massachusetts	2,471,089	99.61	0.18	0.21
Michigan	3,822,709	99.77	0.06	0.17
Minnesota	1,912,965	99.77	0.11	0.12
Mississippi	1,072,396	99.56	0.09	0.34
Missouri	2,220,880	99.80	0.06	0.15
Montana	362,346	99.47	0.17	0.36
Nebraska	670,662	99.81	0.04	0.15
Nevada	756,410	98.97	0.30	0.74
New Hampshire	481,900	99.31	0.27	0.41
New Jersey	3,103,098	99.65	0.20	0.15
New Mexico	689,959	98.92	0.51	0.57
New York	7,158,346	99.40	0.37	0.23
North Carolina	3,192,244	99.58	0.14	0.28
North Dakota	259,975	99.73	0.08	0.19
Ohio	4,486,700	99.79	0.05	0.16
Oklahoma	1,358,786	99.72	0.07	0.20
Oregon	1,349,157	99.44	0.16	0.40
Pennsylvania	4,842,361	99.63	0.15	0.21
Rhode Island	413,305	99.38	0.42	0.20
South Carolina	1,572,867	99.41	0.25	0.34
South Dakota	292,990	99.54	0.15	0.32
Tennessee	2,272,852	99.60	0.17	0.23
Texas	7,484,679	99.50	0.23	0.28
Utah	709,971	99.74	0.08	0.18
Vermont	245,669	99.12	0.11	0.78
Virginia	2,727,095	99.65	0.21	0.14
Washington	2,299,211	99.57	0.13	0.30
West Virginia	748,374	99.77	0.03	0.20
Wisconsin	2,108,271	99.62	0.11	0.27
Wyoming	195,611	99.00	0.30	0.71
Puerto Rico	1,282,691	99.28	0.19	0.53

Table 4. Distribution of Population in Housing Units

Source: Preliminary HCUF

	Population in Housing Units	Percent	
		Not Imputed	Imputed
United States	277,216,072	99.6	0.4
Alabama	4,431,269	99.3	0.7
Alaska	616,581	99.5	0.5
Arizona	5,089,402	99.1	0.9
Arkansas	2,650,345	99.7	0.3
California	33,305,218	99.6	0.4
Colorado	4,240,191	99.6	0.4
Connecticut	3,333,855	99.7	0.3
Delaware	768,475	99.3	0.7
D.C.	537,402	99.1	0.9
Florida	15,753,798	99.5	0.5
Georgia	8,098,137	99.6	0.4
Hawaii	1,201,748	99.4	0.6
Idaho	1,282,573	99.5	0.5
Illinois	12,242,877	99.4	0.6
Indiana	5,983,398	99.6	0.4
Iowa	2,853,073	99.8	0.2
Kansas	2,635,552	99.7	0.3
Kentucky	4,003,253	99.7	0.3
Louisiana	4,421,802	99.7	0.3
Maine	1,258,924	99.5	0.5
Maryland	5,214,617	99.5	0.5
Massachusetts	6,196,929	99.6	0.4
Michigan	9,786,649	99.8	0.2
Minnesota	4,831,290	99.8	0.2
Mississippi	2,821,549	99.6	0.4
Missouri	5,501,497	99.8	0.2
Montana	886,695	99.4	0.6
Nebraska	1,672,247	99.8	0.2
Nevada	1,978,345	99.0	1.0
New Hampshire	1,218,691	99.4	0.6
New Jersey	8,322,810	99.7	0.3
New Mexico	1,816,619	98.9	1.1
New York	18,684,235	99.4	0.6
North Carolina	7,950,518	99.6	0.4
North Dakota	626,214	99.7	0.3
Ohio	11,162,314	99.8	0.2
Oklahoma	3,381,873	99.7	0.3
Oregon	3,382,779	99.4	0.6
Pennsylvania	12,013,242	99.6	0.4
Rhode Island	1,022,301	99.4	0.6
South Carolina	3,980,553	99.4	0.6
South Dakota	733,976	99.5	0.5
Tennessee	5,644,874	99.6	0.4
Texas	20,553,586	99.5	0.5
Utah	2,219,533	99.8	0.2
Vermont	600,928	99.1	0.9
Virginia	6,919,388	99.7	0.3
Washington	5,832,383	99.6	0.4
West Virginia	1,795,948	99.8	0.2
Wisconsin	5,270,716	99.6	0.4
Wyoming	484,900	99.0	1.0
Puerto Rico	3,833,007	99.3	0.7

Table 5. Population per Housing Unit

Source: Preliminary HCUF

	Total	No Pop. Imputation	With Pop. Imputation
United States	2.60	2.60	2.56
Alabama	2.50	2.50	2.50
Alaska	2.74	2.74	2.64
Arizona	2.64	2.64	2.67
Arkansas	2.50	2.50	2.49
California	2.87	2.87	2.66
Colorado	2.53	2.53	2.49
Connecticut	2.53	2.53	2.47
Delaware	2.54	2.54	2.45
D.C.	2.16	2.16	2.11
Florida	2.46	2.46	2.40
Georgia	2.65	2.65	2.58
Hawaii	2.92	2.92	3.05
Idaho	2.69	2.69	2.65
Illinois	2.64	2.64	2.54
Indiana	2.53	2.53	2.55
Iowa	2.46	2.46	2.43
Kansas	2.51	2.51	2.62
Kentucky	2.47	2.47	2.46
Louisiana	2.62	2.62	2.58
Maine	2.39	2.39	2.40
Maryland	2.61	2.61	2.50
Massachusetts	2.51	2.51	2.38
Michigan	2.56	2.56	2.51
Minnesota	2.53	2.53	2.38
Mississippi	2.63	2.63	2.52
Missouri	2.48	2.48	2.43
Montana	2.45	2.45	2.53
Nebraska	2.49	2.49	2.41
Nevada	2.62	2.62	2.41
New Hampshire	2.53	2.53	2.36
New Jersey	2.68	2.68	2.64
New Mexico	2.63	2.63	2.72
New York	2.61	2.61	2.58
North Carolina	2.49	2.49	2.50
North Dakota	2.41	2.41	2.39
Ohio	2.49	2.49	2.40
Oklahoma	2.49	2.49	2.48
Oregon	2.51	2.51	2.52
Pennsylvania	2.48	2.48	2.44
Rhode Island	2.47	2.47	2.53
South Carolina	2.53	2.53	2.52
South Dakota	2.51	2.50	2.80
Tennessee	2.48	2.48	2.47
Texas	2.75	2.75	2.82
Utah	3.13	3.13	2.96
Vermont	2.45	2.45	2.50
Virginia	2.54	2.54	2.51
Washington	2.54	2.54	2.58
West Virginia	2.40	2.40	2.40
Wisconsin	2.50	2.50	2.47
Wyoming	2.48	2.48	2.49
Puerto Rico	2.99	2.99	2.79

Table 6: Completeness of Data for Persons in Households--1990 Census vs 2000 Census

Source 2000 Final HCEF, 1990 Hundred Percent Data

	1990 CENSUS			2000 CENSUS		
	Population in Housing Units	Percent Persons Substituted	Percent Persons Unclassified	Population in Housing Units	Percent Persons Substituted	Percent Persons Unclassified
United States	242,012,129	0.66	0.02	273,643,273	1.26	0.43
Alabama	3,948,185	0.68	0.01	4,332,380	1.61	0.66
Alaska	529,342	0.55	0.04	607,583	0.91	0.54
Arizona	3,584,545	1.04	0.09	5,020,782	2.09	0.88
Arkansas	2,292,393	0.35	0.01	2,599,492	0.81	0.29
California	29,008,161	0.73	0.04	33,051,894	1.12	0.36
Colorado	3,214,922	0.88	0.02	4,198,306	1.33	0.37
Connecticut	3,185,949	1.22	0.02	3,297,626	0.98	0.31
Delaware	646,097	1.16	0.02	759,017	2.19	0.68
D.C.	565,183	2.44	0.02	536,497	2.37	0.89
Florida	12,630,465	0.92	0.01	15,593,433	1.42	0.53
Georgia	6,304,583	0.63	0.01	7,952,631	1.48	0.41
Hawaii	1,070,597	1.01	0.09	1,175,755	1.47	0.52
Idaho	985,259	0.40	0.12	1,262,457	1.15	0.52
Illinois	11,143,646	0.89	0.01	12,097,512	1.57	0.59
Indiana	5,382,167	0.50	0.00	5,902,331	1.61	0.43
Iowa	2,677,235	0.28	0.00	2,822,155	0.54	0.17
Kansas	2,394,809	0.52	0.03	2,606,468	0.71	0.26
Kentucky	3,584,120	0.39	0.01	3,926,965	0.72	0.33
Louisiana	4,107,395	0.73	0.02	4,333,011	1.19	0.33
Maine	1,190,759	0.50	0.02	1,240,011	0.78	0.50
Maryland	4,667,612	0.79	0.01	5,162,430	1.78	0.45
Massachusetts	5,802,118	0.93	0.01	6,127,881	0.99	0.36
Michigan	9,083,605	0.41	0.01	9,688,555	0.68	0.22
Minnesota	4,257,478	0.41	0.01	4,783,596	0.67	0.22
Mississippi	2,503,499	0.54	0.03	2,749,244	0.84	0.39
Missouri	4,971,676	0.35	0.01	5,433,153	0.67	0.20
Montana	775,318	0.37	0.07	877,433	1.01	0.55
Nebraska	1,530,832	0.26	0.03	1,660,445	0.52	0.18
Nevada	1,177,633	0.47	0.03	1,964,582	2.21	0.95
New Hampshire	1,077,101	0.65	0.02	1,200,247	1.47	0.65
New Jersey	7,558,820	1.01	0.01	8,219,529	1.21	0.34
New Mexico	1,486,262	1.07	0.23	1,782,739	2.11	1.12
New York	17,445,190	0.77	0.02	18,395,996	2.23	0.60
North Carolina	6,404,167	0.48	0.01	7,795,432	1.08	0.42
North Dakota	614,566	0.26	0.08	618,569	0.57	0.26
Ohio	10,585,664	0.35	0.00	11,054,019	0.60	0.20
Oklahoma	3,051,908	0.56	0.02	3,338,279	0.73	0.27
Oregon	2,776,116	0.35	0.04	3,343,908	1.05	0.54
Pennsylvania	11,533,219	0.55	0.01	11,847,753	1.01	0.36
Rhode Island	964,869	1.79	0.01	1,009,503	1.73	0.63
South Carolina	3,370,160	0.83	0.02	3,876,975	1.53	0.58
South Dakota	670,163	0.53	0.11	726,426	0.81	0.52
Tennessee	4,748,056	0.43	0.01	5,541,337	1.08	0.40
Texas	16,593,063	0.73	0.03	20,290,711	1.62	0.51
Utah	1,693,802	0.41	0.11	2,192,689	0.72	0.25
Vermont	541,116	0.54	0.05	588,067	1.61	0.92
Virginia	5,978,058	0.46	0.01	6,847,117	1.00	0.34
Washington	4,746,161	0.47	0.03	5,757,739	1.16	0.43
West Virginia	1,756,566	0.50	0.01	1,765,197	0.48	0.23
Wisconsin	4,758,171	0.31	0.01	5,207,717	1.02	0.37
Wyoming	443,348	0.65	0.11	479,699	1.85	1.02